

Claims

- [c1] 1. A three-dimensional output system comprising: a hardware decoder that receives live broadcast signals and outputs video frames; a three-dimensional graphics chip having a texture memory that transforms said video frames to three-dimensional graphics frames and outputs said three-dimensional graphics frames to an output device; and a transport mechanism that obtains said video frames from said decoder and transports said frames to said texture memory of said three-dimensional graphics chip.
- [c2] 2. The system of claim 1 further comprising: a synchronization mechanism that synchronizes the output of said video frames from said decoder and the output of said three-dimensional graphics frames to said output device.
- [c3] 3. The system of claim 1 wherein said transport mechanism comprises a PCI bus.
- [c4] 4. The system of claim 1 wherein said output device is a television set.
- [c5] 5. The system of claim 1 wherein said output device is a monitor.
- [c6] 6. The system of claim 2 wherein said synchronization mechanism ensures that said output of said video frames and said output of said three-dimensional graphics frames is at a rate of approximately thirty frames per second.
- [c7] 7. The system of claim 1 wherein said hardware decoder, said three-dimensional graphics chip, and said transport mechanism reside in a set-top box.
- [c8] 8. The system of claim 7 wherein said hardware decoder, said three-dimensional graphics chip, and said transport mechanism are all components of a single chip.
- [c9] 9. The system of claim 7 wherein said hardware decoder, said three-dimensional graphics chip, and said transport mechanism are all components on separate chips.
- [c10] 10. The system of claim 1 wherein said transport mechanism transports said

frames to said texture memory from said decoder using a direct memory address (DMA) transfer.

[c11] 11. The system of claim 1 wherein said transport mechanism further comprises: a special core component configured to receive a YUV decompressed video frame across a VIP bus from said hardware decoder; a PCI core configured to receive said YUV decompressed video frame from said special core component via a DMA transfer and to send said YUV decompressed video frame to a PCI bus.

[c12] 12. The system of claim 11 wherein said special core component is written in a hardware definition language.

[c13] 13. The system of claim 12 wherein said hardware definition language is Verilog.

[c14] 14. A method comprising: decoding live broadcast signals with a decoder; transporting said live broadcast signals to a graphics chip; and rendering a three-dimensional graphics image on an output device using said live broadcast signals.

[c15] 15. The method of claim 14 further comprising: synchronizing an output of said live broadcast signals from said decoder with an output of a three-dimensional graphics frame from said graphics chip.

[c16] 16. The method of claim 14 wherein said step of transporting comprises, using a PCI bus.

[c17] 17. The method of claim 14 wherein said output device is a television set.

[c18] 18. The method of claim 14 wherein said output device is a monitor.

[c19] 19. The method of claim 15 wherein said step of synchronizing ensures that said output of said live video signals and said output of said three-dimensional graphics frames is at a rate of thirty frames per second.

[c20] 20. The method of claim 14 wherein said step of transporting comprises, using a direct memory address (DMA) transfer.

- [c21] 21. The method of claim 15, further comprising: determining if a user interface (UI) event has occurred; and performing a three-dimensional graphics operation, if said UI event has occurred.
- [c22] 22. The method of claim 21 wherein said UI event comprises a changing of a television channel.
- [c23] 23. The method of claim 21 wherein said UI event comprises a pausing of a live or a recorded television show.
- [c24] 24. The method of claim 21 wherein said UI event comprises initiating a menu or a program guide.
- [c25] 25. The method of claim 21 wherein said UI event providing input to a television set or a set-top box.
- [c26] 26. The method of claim 21 wherein said three-dimensional graphics operation comprises a rotation of a three-dimensional graphics frame.
- [c27] 27. The method of claim 21 wherein said three-dimensional graphics operation comprises a shatter effect.
- [c28] 28. The method of claim 21 wherein said three-dimensional graphics operation comprises a warping effect.
- [c29] 29. The method of claim 21 wherein said three-dimensional graphics operation comprises a surface mapping.
- [c30] 30. The method of claim 21 wherein said three-dimensional graphics operation comprises a motion blur.
- [c31] 31. The method of claim 21 wherein said three-dimensional graphics operation comprises an operation performed in a three-dimensional graphics environment.
- [c32] 32. A computer program product comprising: a computer usable medium having computer readable program code embodied therein comprising: computer readable program code configured to cause a computer to decode live

broadcast signals with a decoder; computer readable program code configured to cause a computer to transport said live broadcast signals to a graphics chip; and computer readable program code configured to cause a computer to render a three-dimensional graphics image on an output device using said live broadcast signals.

[c33] 33. The computer program product of claim 32 further comprising: computer readable program code configured to synchronize an output of said live broadcast signals from said decoder with an output of a three-dimensional graphics frame from said graphics chip.

[c34] 34. The computer program product of claim 32 wherein said computer readable program code configured to transport comprises, computer readable program code configured to use a PCI bus.

[c35] 35. The computer program product of claim 32 wherein said output device is a television set.

[c36] 36. The computer program product of claim 32 wherein said output device is a monitor.

[c37] 37. The computer program product of claim 33 wherein said computer readable program code configured to synchronize ensures that said output of said live video signals and said output of said three-dimensional graphics frames is at a rate of thirty frames per second.

[c38] 38. The computer program product of claim 33 wherein said computer readable program code configured to transport comprises, computer readable program code configured to use a direct memory address (DMA) transfer.

[c39] 39. The computer program product of claim 33, further comprising: computer readable program code configured to determine if a user interface (UI) event has occurred; and computer readable program code configured to perform a three-dimensional graphics operation, if said UI event has occurred.

[c40] 40. The computer program product of claim 39 wherein said UI event comprises a changing of a television channel.

- [c41] 41. The computer program product of claim 39 wherein said UI event comprises a pausing of a live or a recorded television show..
- [c42] 42. The computer program product of claim 39 wherein said UI event comprises initiating a menu or a program guide.
- [c43] 43. The computer program product of claim 39 wherein said UI event providing input to a television set or a set-top box.
- [c44] 44. The computer program product of claim 39 wherein said three-dimensional graphics operation comprises a rotation of a three-dimensional graphics frame..
- [c45] 45. The computer program product of claim 39 wherein said three-dimensional graphics operation comprises a shatter effect.
- [c46] 46. The computer program product of claim 39 wherein said three-dimensional graphics operation comprises a warping effect.
- [c47] 47. The computer program product of claim 39 wherein said three-dimensional graphics operation comprises a surface mapping..
- [c48] 48. The computer program product of claim 39 wherein said three-dimensional graphics operation comprises a motion blur.
- [c49] 49. The computer program product of claim 39 wherein said three-dimensional graphics operation comprises an operation performed in a three-dimensional graphics environment.